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ABSTRACT

This paper develops guidelines for instructional materials for advanced English as a second language students in which the objects of instruction would be: (1) the relationship between surface structures of lexical items and their underlying meanings; (2) the important aspects of structural forms; and (3) the special uses of words in the lexicon of English for Preventive Medicine (EPM) which have been borrowed from ordinary English or from Greek or Latin. The analytic approach used in the study extracts significant language forms from textual passages for special study. The study is based on the concept that vocabulary and syntax are closely interrelated and that, therefore, both are essential in the production of meaning. The model worked out in the study accounts for the sources of lexical items, their potential syntactical and morphological modifications, and their dependence or lack of dependence on context. Distinctive features of the lexicon are identified and analyzed and tentative generalizations are drawn. Instructional guidelines and sample vocabulary exercises are proposed. The excercises were constructed in anticipation of problems that foreign graduate language learners are likely to encounter. (Author/AMH)

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LEXICAL EXPLORATION FOR ADVANCED ESL STUDENTS IN PUBLIC HEALTH

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN ENGLISH AS A SECOND LANGUAGE

AUGUST 1979

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ABSTRACT

The position taken in this study is that many advanced ESL students entering schools of public health in the United States need and can benefit from instructional help with the lexicon of English for preventive medicine (EPM), which contrasts with ordinary English. The specific goal has been to develop guidelines for instructional materials in which the objects of instruction would be (1) the relationship between surface structures of lexical items and their underlying meanings; (2) the important aspects of structural forms; and (3) the special uses of words borrowed from ordinary English or from Greek/Latin.

David Wilkins' (1976) analytic approach provides the theoretical framework for general language teaching/learning. This approach has been combined with the empirical findings of this study to characterize the lexicon for EPM. The analytic approach extracts and isolates significant language forms from textual passages for special study. This approach contrasts with synthetic approaches which base their teaching on hierarchically sequenced forms which are arranged progressively according to the writer's notion of difficulty.

A survey of the literature reveals a dearth of materials which deal with principles and techniques for teaching/learning the lexicon of English for Science and Technology (EST), of which EPM is a variety. Somewhat paralleling the status of vocabulary teaching in general language teaching, vocabulary instruction in EST in general appears to be considered secondary in importance to syntax. Rather than taking an either/or stance, this study is predicated on the concept that vocabulary and syntax are closely interrelated and therefore both are essential in the production of meaning. Hence attention to both should begin early in language learning.

The model developed in this study identifies three major classes of EPM lexicon: the derived lexicon, the pseudo-derived lexicon, and the simple lexicon. Common lexical processes are presented through an analysis of the model, which accounts for the sources of lexical items, their potential syntactical and morphological modifications, and their dependence or lack of dependence on context. Distinctive features of the lexicon are identified and analyzed and tentative generalizations are then drawn from the analysis.

Based on the analysis of the lexicon for EPM, instructional guidelines are proposed and sample vocabulary exercises constructed in anticipation of problems that foreign graduate language learners are likely to encounter. These exercises were then tried on volunteer subjects.

This study suggests the usefulness of vocabulary exercises which combine the principles of the analytic approach and the working principles developed in this study. However, further experimentation and testing is suggested to broaden the scope of exercises and to increase the sample to be tested, in order to confirm or disconfirm the tentative findings of this study.

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I. INTRODUCTION

The problem addressed in this study is twofold: first to identify and describe salient characteristics of the lexicon of English for preventive medicine[1] as it is used in medically oriented programs in public health and in college level textbooks, and second, to suggest instructional approaches for helping foreign graduate students learn how to deal with that lexicon. It is assumed that even at the graduate level, many foreign students have difficulty understanding specialized English presumably because of their lack of familiarity with currently used English and lack of exposure to native speakers of English prior to their arrival in the United States.

The decision to focus on developing a rationale and guidelines for the preparation of instructional materials for language learners in the field of public health stems from my personal interest in and familiarity with some aspects of public health, acquired through a number of years of experience and training in public health.

The impetus for deciding upon a lexical study came from my participation in a seminar on vocabulary instruction. The seminar dealt with

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[1] The field of public health (a sub-specialty of Medicine) is an amorphous professional discipline which includes a broad spectrum of health professionals. These professionals are usually individuals who bring not only their basic expertise from their primary fields but also their specialized language--physicians, psychiatrists, psychologists, nurses, social workers, engineers, dentists, therapists, etc. The specialized language of each program is influenced by the basic services provided and the type of professional required to head such a service e.g. in a Maternal and Child Health Services program, a physician is required to provide direction to the multi-disciplinary staff. Since the program is medically oriented, the specialized language is also thus oriented.

instructional aspects of vocabulary teaching/learning such as: What characteristics of words should be looked at? What do we know when we know a "word"? This analytical approach to vocabulary instruction seemed to be a very desirable and interesting approach, and it was perhaps the main reason for my undertaking this study.

Because the development of principles and techniques for vocabulary instruction in general has been de-emphasized since the 1940s until recently in second language instruction because of the influence of the structural linguists (Crymes 1978), there is a dearth of material on the subject of teaching methods and techniques for vocabulary instruction. Particularly glaring is the lack of instructional materials on vocabulary for specialized English, such as for English for Science and Technology (EST, e.g. medical English). The pressing need for providing instruction on medical English to foreign language learners is a relatively recent phenomenon, beginning in the 1960s. Van Naerssen (1978) reports, in her survey of needs of foreign medical graduates, that by 1975 a crisis was developing in the medical profession, as large numbers of foreign physicians in the U.S. were seriously hampered in their communication with their patients, nurses and other doctors because of their lack of language skills. Ford (1974) reports that since the early 1960s many linguists have taken an interest in the construction of sentences written in technical English, but that most of their studies have little to recommend them in learning and teaching technical English.

For this study, literature was reviewed in search of principles and methods of teaching scientific lexicon to foreign graduate language

learners, specifically English for preventive medicine (EPM),[2] but with disappointing results, as information which was believed to be available from certain sources was almost nil. In his review of Mackay and Mountford's English for Specific Purposes: A Case Study Approach, (1978), J.D. Palmer comments that this text provides a step by step program for the "correct and effective order of events in making a good English language course," but laments the fact that "the book lacks concrete steps for course planners to follow. It does not provide a definite methodology or techniques of syllabus design."

Many of those who write about vocabulary which is used in scientific writing tend to write about the characteristics of scientific style, that is, the specialized use of vocabulary and grammar, for example, the frequent use of premodifiers and postmodifiers, and so forth (Johns 1977; and Ford 1974), but do not provide a systematic presentation of principles and techniques or model which can be replicated.

Some writers advocate the use of word lists, such as Cowan (1974) who proposes a master list for medical vocabulary from which to select and to sequence teaching points for reading materials. Others prepare materials to teach vocabulary in an incidental manner, in dialogues, drills and other types of exercises in which vocabulary is treated as secondary to sentence practice, pronunciation, and general language skills along with medical terminology, such as the use of formulaic expressions (Austin and Crosfield 1976; and English Language Services

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[2] The acronym EPM will be used in this study to refer to English for preventive medicine.

Inc.1966).

D.E. Adams-Smith in Al Manakh (1978-79) comments on the low priority which is given to teaching vocabulary and notes that "there is a tendency to teach vocabulary only when driven to it, apologetically and with a guilty look over the shoulder." She reports her findings of a survey of a number of texts which were written for ESL students, to determine the methods and techniques they used for teaching vocabulary. The study was focused on technical vocabulary. A number of textbooks were examined including: Practice in Medical English, Kenneth Methold and Chuntana Methold, 1975; English in Focus: English in Basic Medical Science, Joan MacLean, 1975; Special English, Book 1: Nursing, Donald Dallas, 1971; The Scientist Speaks: The English of Science and Technology, B.B.C./British Council, 1967; Scientifically Speaking: An Introduction to the English of Science and Technology, ed. B.C. Brookes, 1971; and The Language of Hospital Services in English, Gretchen Bloom, 1976.

According to Adams-Smith, most of the textbooks are aimed at teaching lexical meanings, using glossaries, word studies and fill-in type exercises. The exception to this general tendency was the use of paraphrasing exercises and the teaching of locative prefixes in English in Basic Medical Science. Adams-Smith found little unanimity among the teachers and materials writers as to the "best" method for teaching vocabulary.

A review was done for this study of materials which seemed likely to be related to the study of vocabulary, available at the EST Clearinghouse (1977-79), a depository for EST materials collected from

ESP-EST writers and teachers from all parts of the world and distributed upon request by the EST Clearinghouse.[3] However these materials dealt primarily with syntax or rhetoric and were therefore not germane to this study.

Thus it appears that EST lexicon, e.g. medical English lexicon, as a language component worthy of special and intensive study, has not been dealt with as yet as a need in the EST community. Therefore, in the absence of relevant literature on the preparation of vocabulary materials, the decision was made to undertake a prototypical study consisting of an analysis of selected characteristics of EPM.

The basic techniques used in this study were analytical and descriptive. The report of the study is composed of six chapters. Chapter II, which follows the Introduction, discusses the conceptual framework for an analytic approach, developed by Wilkins (1976), upon which this study is based for aspects pertaining to general language teaching/learning. The analytic approach contrasts with the structural linguists' approach, which presents hierarchically sequenced language forms so that the simple forms are taught first and the more difficult forms are taught in a step-by-step progression. Wilkins sets aside the notion of difficulty and argues that significant forms should be taught that are useful to the learner, instead of teaching forms simply because they are present in a text. He advocates the use of authentic texts from which significant language forms can be selected and isolated for special study. This latter approach is in consonance with Stevick's (1967) earlier proposal

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[3] The name of the EST Newsletter was changed to ESP (English for Specific Purposes) Newsletter in April 1979.

that teaching/learning emphasize materials that reflect real language use. For graduate language learners, textual materials would be selected from their specialized fields.

Chapter III discusses the rationale for initiating a prototypical study on English for preventive medicine, presents the bases for selecting and gathering data, that is, the criteria for selecting lexical items from public health texts, and describes the three major classes of EPM lexicon that were identified in this study. Six passages were selected from unsimplified, authentic public health texts and lexical items extracted from them for special study. Passages were limited to 500 words. Each passage was examined for lexical patterns. Examples are: (1) nouns with single and multiple premodifiers, which are reduced phrases (phrasal units) derived from expanded clauses or phrases, (2) reduced phrasal units, e.g. noun remnants and nominalized adjectives, (4) formulaic lexical items, and (5) words borrowed from ordinary English which are assigned special meanings in English for preventive medicine as well as those that are borrowed from Greek/Latin (prefixes + bases only, in this study). The term ordinary English is used in this study as a label for non-specialized lexical items (ordinary English) in contrast with specialized lexical items (EPM).

Chapter IV provides an analysis and description of a classification system which was based on data collected and which is illustrated diagrammatically. The three major classes of EPM lexicon which were identified are the derived, pseudo-derived, and simple lexicon. These were analyzed by class and sub-types according to their characteristics, and a distinctive feature chart was developed. Some tentative generaliza-

tions are drawn from the analysis displayed in Figure 2.

Chapter V discusses a possible approach to materials development. Four sets of exercises are constructed which illustrate techniques for handling lexical problems that may be anticipated. Specifically, these exercises are: (1) a preliminary exercise, to assess the lexical needs of students in EPM lexicon; (2) three exercises which deal with derived lexicon--an exercise on reduced phrases, an exercise on reduced clauses, and an exercise on acronyms; (3) an exercise on pseudo-derived lexicon; and (4) two exercises on simple lexicon (words borrowed from ordinary English and those borrowed from Greek/Latin (prefixes + bases)).

Finally, Chapter VI summarizes the study and draws some conclusions.

The empirical nature of this pilot study points to the tentativeness of the findings and conclusions and suggests that further experimentation and testing be done, which may lead to establishing a set of principles and guidelines which may be applicable on a broader scale than this study encompasses.

II. A FRAMEWORK FOR MATERIALS PREPARATION

In contrast with much ESL instruction, which mainly emphasizes the teaching of grammar through the use of graded materials, this study explores the use for ESL instruction of unsimplified authentic texts, in this instance from the field of public health.

Among the various writers who advocate the use of authentic texts, Wilkins (1976) appears to provide the most principled, pragmatic justification for the approach used in this study. He conceives of two major approaches to teaching the English language, one which he labels "synthetic" and the other "analytic," which are defined below--the latter being the approach to which he subscribes. He then proposes a notional syllabus,[1] using an analytic strategy in the structuring of a language learning course, in which semantic content is the organizing principle. The present study does not address syllabus construction. It addresses the issue of teaching the lexicon of English for preventive medicine to non-native speakers. But the approach it takes to vocabulary instruction draws on Wilkins' arguments for an analytic approach.

The major difference between the synthetic and analytic approaches is that in the analytic approach, language is presented as a whole from which the learner moves to parts whereas in the synthetic approach the movement is in the opposite direction. In other words, in the analytic approach significant linguistic forms are selected from a textual

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[1] For the notional syllabus, Wilkins (1976:18) suggests that questions be raised about what speakers of the language communicate through language rather than how speakers express themselves or when and where they use the language, as is done in the grammatical and situational syllabuses.

passage and isolated for special study, and in the synthetic approach linguistic structures are placed in ordered lists and the learner masters each unit before he progresses to the next. The task of synthesizing the parts into a communicative act is the responsibility of the learner.

A closer examination of the synthetic and analytic approaches, based on Wilkins' assessment (1976), will help to clarify the inherent differences between the two approaches. Wilkins focuses primarily on general language use. However, some reference is made to specialized uses of English, especially in instances where contrasts in language use serve to differentiate ordinary English from specialized language use, e.g. the specialized vocabulary and the specialized distribution of grammar in scientific writing.

Synthetic Approaches

Language instruction based on a synthetic approach is primarily concerned with sequencing and presenting grammatical structures. The learner is expected to synthesize each part with the preceding parts as he goes along. The learner is exposed to language according to the syllabus design. The units are often identified by grammatical labels such as "the definite article," "past tense," "transitive sentences," "adverbs of frequency," "the order of adjectives," and so forth. Sometimes more attention is given to the way items contrast paradigmatically with other items, that is, to morphology, than to syntax. For example, the definite article may be contrasted with the indefinite article and the present tense with the past. Since the total number of morphological contrasts is limited, it is possible to learn at least the forms of all of them and the relations between them.

The synthetic approach assumes that grammatical forms in instructional materials can be graded and ordered, as stated earlier, on a range of simple (easy) to complex (difficult). The validity of the principle that grammatical structures can be placed on a graduated scale has never been demonstrated because linguistics has not as yet provided measures for variables which are psycholinguistically valid. Higa (1965:167-179), commenting on a similar problem with vocabulary, elaborates on the complexity of the notion of what "difficulty" implies psychologically, experientially and culturally. At the present time, therefore, selection and grading of syntactic or lexical forms is done primarily on an intuitive basis.

In synthetic approaches, vocabulary teaching is secondary to teaching syntactic structures (Wilkins 1976:1,2; Judd 1978:71-75), at least at beginning levels. The language learner is therefore given limited exposure to vocabulary learning.

Teaching selected aspects of language takes precedence, in synthetic approaches, over the language learner's needs. Teachers must plan materials and methods which will fit into the general scheme of teaching a set number of grammatical structures in a step-by-step progression that is aimed at eventually leading the learner to the global language. The learner is the recipient of all the planning and teaching that is done for him. He participates to the extent that he attempts to learn the content which others have predetermined that he needs in order to learn the language. Because of the grammatical sequencing of the synthetic approach, the language learner's exposure to real language use in the classroom is minimal.

Analytic Approaches

The analytic approach refers specifically to the process of selecting significant linguistic forms from natural texts (e.g. an affix, word, phrase or sentence), and extracting and isolating them from the remainder of the text so that they can be focused upon for special study. This process of focusing on significant aspects of lexical and grammatical forms is a useful technique for studying lexical and grammatical processes since the forms can be viewed against the background of their authentic use in a natural text.

An underlying principle in analytic approaches is that plans for teaching and learning are centered on the purpose(s) for which the individual learner is learning the language. Forms which are to be studied are therefore chosen selectively, rather than randomly, on the basis of their usefulness to the learner (Wilkins 1976:8). Furthermore, the lexical content of the teaching materials is based on topics and closely related sub-topics from the learner's specialized field of study. Thus the use of authentic texts can play an important role in language teaching and learning.

The use of authentic textual materials is a relatively recent innovation. In 1967 (Stevick (1967:3-10) proposed the use of natural texts for teaching foreign language learners, using either written or spoken materials which provide authentic information. At that time, it was a new idea, a major departure from the philosophy and practices of the dominant Friesian structuralist school of thought which gave priority to sequencing instructional materials in terms of grammatical structures within a "limited vocabulary" (Fries 1945:3). Stevick (1967) set forth three

criteria for selecting authentic texts: (1) textual materials should be selected for their relevance to the interest of the language learner, (2) they should express realism, that is they should illustrate real language use, and (3) there should be a recurrence of vocabulary. More recently Stevick (1971) has emphasized the point that in evaluating a lesson, one of the important considerations is the authenticity of the materials, both linguistically and culturally. In other words, the content of the lesson should be usable immediately and in a practical "lifelike way" be of practical value to the learner.

While the use of authentic texts for language teaching and learning is still not universally accepted or practiced, and the grammatical approach appears to be the more dominant modality, a number of current writers and teachers (Wilkins 1976; Crymes 1978; Honeyfield 1978) promote their use and seem to accept as valid the underlying principles that Stevick spelled out in 1967, the foremost of which is to provide instructional materials that will give the language learner experience in real language use as it is expressed by native speakers of the target language.

In summary, the following comparisons between the synthetic and analytic approaches have been noted:

In contradistinction to the synthetic approach, the analytic approach selects significant linguistic forms from textual material for special study instead of using a hierarchically ordered list of structures; it uses authentic texts written by native speakers for native speakers and therefore it provides the language learner an opportunity to experience real language in use. This contrasts with the approaches taken in synthetic systems which use instructional materials that are adaptable

to the classroom situation more frequently than to the real world of language use. Analytic approaches also provide an opportunity to pay much more attention to lexical items, because priority is not allocated to grammatical structures as in the synthetic approaches. Yet analytic approaches do not negate the importance of syntactic structures, as they acknowledge the interdependence between lexical items and concomitant grammatical structures in the expression of meaning. The overall effect of the analytic approach, it seems, is to achieve a more rational balance between teaching the lexical processes and teaching those grammatical structures which significantly interact with them than is possible under the synthetic approach.

III. DATA COLLECTION

The rationale for investigating second language teaching approaches for foreign graduate students in public health lies in the fact that scientific writing, which the field of public health uses, contrasts rather decidedly with ordinary English. The English language is used in a specialized way in each scientific field. This special use of English compounds a language problem which many foreign students have, that is, the problem of coping with ordinary English, because of their lack of familiarity with the many ways in which English is used by native speakers.

This study focuses on the development of an analytical framework for characterizing the lexicon for English for preventive medicine--both the specialized lexical items and the related specialized grammar--as the object of instruction. While the fundamental principles of Wilkins' analytic approach were applicable to this study, his discussion revolves mainly around general language teaching and few references are made to the specialized use of English. Consequently, in the absence of a model which might be replicated, a prototypical study was developed for identifying specialized vocabulary in public health (and other scientific fields) in which samples of identified types of lexicon are illustrated. Hence while this study may be considered to be a spin-off of Wilkins' analytic approach, the detailed design and analysis of the lexical system can only be considered to be very rudimentary and experimental.

The specialized use of the English language in scientific writing is often referred to loosely as the "scientific style" of writing because there are common language characteristics which all scientific fields

share, such as specialized vocabulary and the related specialized grammar which identifies scientific writing. Furthermore, each field has sub-specialties which generate their own special lexical items. Because each specialized field has its own lexicon, the languages of these fields are often referred to as "varieties of English," e.g. "medical English," "legal English," "engineering English" (Wilkins 1976).

In this study, reference is made to medical English, specifically English for preventive medicine. The authentic texts used were written by medical specialists in the field of maternal and child health care.

For the language teacher of medical English (as well as of other fields of science and technology) the historical significance of scientific style, dating back to Aristotelian days,[1] provides a perspective, inasmuch as the characteristics of scientific writing, which began so many centuries ago, are still extant in medical writing today. Two characteristics of the style will be explored in this study: (1) the compression of lexical meanings, and (2) the lack of ambiguity of lexical items. The first derives from the fact that the specialized grammar in scientific writing mentioned earlier in part manifests itself in various lexical "shorthand forms" (Ford 1974:4). The second derives from the

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[1] "What Euclid did for mathematics, Aristotle did for biology, physics, literary criticism, ethics, politics, and government. Aristotle's stylistic innovations and departures from Plato are so obvious that their importance is sometimes overlooked. Aristotle could speak with what Cicero called his "golden flame of oratory" in his dialogues, unfortunately lost, but this phrase hardly applies to his extant treatises on physics, ethics, or even poetics." (Paraphrase of Michel Ruch, Le préambule dans les oeuvres philosophiques de Cicéron (Paris: Les Belles Lettres, 1958), 38, 47 in Kinneavy 1971:168-169).

fact that lexical items which are used in scientific writing have generally been borrowed and given unambiguous special meanings. They have been borrowed from non-specialized English or from Greek/Latin (the latter are sometimes referred to as "imported" words). Occasionally they have been invented or coined (Savory 1967).

Criteria for the selection of textual materials

Following are criteria for selecting textual materials to be used as a basis for developing instructional materials for specialized vocabulary compatible with the analytic approach. The criteria are illustrated by reference to the textual materials in public health examined for this study.[2]

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[2] Six passages were selected from the following texts:

1. Helen Wallace et al. Maternal and Child Health Practices. 1973.

Maternal and Child Health Practices was the main textbook which was used. This is a comprehensive textbook on maternal and child health care. It is a compilation of chapters written by physicians who are specialists in the field of maternal and child health care. It is aimed at an audience of public health students and related professionals and it is basically written for informative and descriptive purposes.

2. James S. Thompson and Margaret A. Thompson. Genetics in Medicine. 1966:4,8.

This is an introductory textbook on genetics for medical students. A passage was selected for study here, because of the relevance of genetics to the central topic used in this study--the prevention of birth defects.

3. Maya Pines. The New Human Genetics. 1976.

This publication discusses recent findings in the field of human genetics. Particularly germane to the topic of the "prevention of birth defects" is the discussion on the advances made in the technology of human tissue culture which makes it possible to detect Down's Syndrome (Mongolism) and many other disorders before the child is born.

Stevick's (1967) criteria of relevance to the learner, realism, and recurrence of vocabulary were used in conjunction with the following criteria, specifically developed for the selection of textual materials in public health:

1. Unsimplified authentic textual materials should be selected that are either used in schools of public health or that would be relevant to public health concerns and are of interest to the language learner. Authentic texts provide the learner a diversity of samples of real language use which are written by native speakers for native speakers of English.
2. Textual material should be compatible with the level with which the learner can cope. Textbooks vary according to the audience for whom they are intended in the level of intensity of technical information and style. A textbook written for basic information and description would be less technical than one written by a scientist or researcher for an audience of peers. For new graduate language learners, the informative, descriptive type of textbook material, while less technical than some others, probably is more useful because the learners can cope more readily with less complex material to begin with. The unsimplified authentic texts which were selected for this study were compatible with the reading level at which graduate students in public health are expected to cope and with which foreign language learners can learn to cope, with instructional help.

3. Textual materials should present a main topic and closely related sub-topics that will provide lexical content which is then used as a vehicle for teaching/learning specialized lexicon. In specialized language teaching, the main topic/sub-topics come from the specialized field. In this study the main topic which was selected was: "The prevention of birth defects," and the text materials included discussions of prenatal care of good quality. Sub-topics were: "nutrition," "genetic diseases," and the "effects of smoking and ingestion of drugs during pregnancy," which are subjects that are closely related to the main topic.

4. Textual materials should be limited to passages of not more than 500 words. Limiting the size of the samples makes it possible to exploit the text fully thus tending to increase the number of lexical patterns to which the learner can be exposed.

Once the passages had been selected for the present study, lexical items with public health referents were identified and analyzed. The following classification emerged:

1. Syntactically and morphologically derived lexical items (compressed terminology).

   In a sentence these items function like the full forms that they are derived from. These are phrases which are reduced, or compressed, forms. In the classification developed for this study, these items are members of the derived lexicon of English for preventive medicine.

   Examples: local disease patterns, too rapid child bearing

2. Formulaic items (compressed terminology).

   These are lexical items which function differently from the full forms that they perhaps originally derived from. These phrasal units are labels for professional titles, medical procedures, diagnostic terms, etc. These items are classified as pseudo-derivations.

   Examples:

   pediatric cardiologist, head nurse, diabetes mellitus

3. Borrowings and coinages (single, unambiguous meaning)

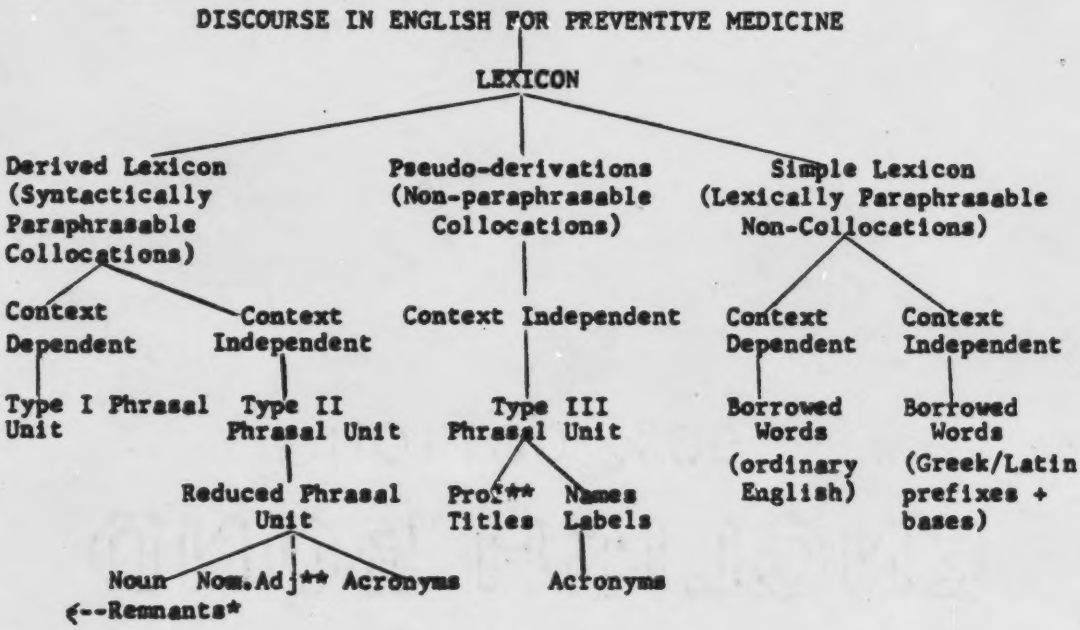
   These may be borrowings from ordinary English with assignment of special meanings in English for preventive medicine, e.g. screening, or borrowings from another language, usually Latin or Greek, e.g. contraindicated, or invented or coined words, e.g. acronyms such as WHO. These items are classified as simple lexicon.

The only imported words which were selected for analysis were words with prefixes. It was necessary to limit the selection to one type (of imported words) because of the vast number of classes and categories of Greek and Latin words.

IV. LEXICAL ANALYSIS

The system which emerged from the classification of lexical items presented at the end of Chapter III is displayed in Figure 1. This lexical system is a discourse characteristic of English for preventive medicine.

Figure 1.



*Noun remnants which are derived from context independent phrasal units, are context dependent. The dotted line represents their movement from the independent to dependent category.

**Abbreviations:
Prof. = professional
Nom. Adj. = nominalized adjectives

"Discourse" here is the umbrella under which the conceptual framework for lexical patterns was developed in order to classify and describe the component parts of the system, as well as to show the interrelationships,

the similarities, and the dissimilarities among the features of lexical patterns. The main task of this chapter is to elucidate Figure 1.

The primary emphasis in this study is on lexical processes rather than on lexical meanings per se. A process may involve syntactic derivation or it may not. If syntax is involved the lexical result is reduction, or compression. If syntax is not involved, the process is one which assigns unique, specialized meaning to words borrowed either from ordinary English or from Greek or Latin. The main point to make about lexical meanings per se is that in medical English lexical items are restricted to denotative meanings only (referential meanings which describe the relationships between lexical items and things, actions or ideas). Connotative meanings are avoided because conventions in EPM dictate the non-use of emotive terminologies, that is, connotative meanings referring to the various meanings a word is associated with in ordinary English. Connotative meanings often express the attitude of the language user and the speaker's emotional reactions, and since words with emotive meanings are not acceptable in EPM, they are avoided.

Lexical items are either context dependent or context independent. In EPM, Type I phrasal units and words borrowed from ordinary English which are assigned special meanings are context dependent. These lexical items can be understood only within the discourse in which they occur. Examples of Type I phrasal units that are dependent for meaning on the context in which they occur are: cigarette smoking mothers and necessary adjuncts.

Within their proper context they can be readily understood. For example, cigarette smoking mothers tend to have smaller infants means

cigarette smoking (expectant) mothers...and genetic diagnosis and counseling are necessary adjuncts identifies what the adjuncts refers to. Examples of context dependent simple lexicon (words borrowed from ordinary English) are: management (of the patient), which means "medical supervision" (of the patient), and labor, which means "physical efforts of childbirth."

Context independent lexical items are those that can be understood in their public health meanings outside of the discourse in which they occur. They express explicit conceptual meanings in maternal and child health care. Type II and III phrasal units and prefixes + bases (simple lexicon) are context independent lexical items. Examples of Type II phrasal units are premature infants and health team. Examples of Type III phrasal units are medical director and digestive system. Examples of prefixes + bases are prenatal and contraindicated.

The grammatical basis for context dependence and context independence will be discussed below.

Type I, II, and III phrasal units are by definition collocations. Collocations are words that go together, often in juxtaposition but not necessarily so, as the words may be separated within the same sentence or by another sentence (Brown 1974:10). In this study collocation is used in a limited sense to mean lexical items juxtaposed in phrasal units in contrast with simple lexical items which are single words. Type I and II phrasal units are syntactically paraphrasable collocations. Type III phrasal units are neither derived nor paraphrasable. They are formulaic lexical items.

The three major classes of EPM are thus: (1) derived lexicon (lexical

units that result from a syntactical process and retain a lexical relationship to the underlying form) (2) pseudo-derivations (formulaic lexical patterns which have the appearance of derived lexicon, but which have lost their lexical relationship to the underlying form), and (3) simple lexicon (words which are borrowed from ordinary English and assigned special meanings in EPM or borrowed from Greek/Latin).

The foregoing overview of the lexical analysis provides a backdrop for the following detailed discussion of these three major classes. This discussion will be followed by an analytical summary of the distinctive features of the lexicon for preventive medicine, presented as a set of generalizations.

Derived Lexicon

The derived lexicon is the result of syntactic processes. These syntactic processes range from simple, e.g. a healthy patient (single premodifier) to complex distributions, e.g. a normal healthy expectant (multiple premodifiers).

The surface structures that constitute the derived lexicon are derived from underlying structures. Analysis of them here is made informally and the term "derived" is specifically related to syntactically-morphologically derived meanings, which can be illustrated, for example, by the use of paraphrases rather than by transformational analysis. Paraphrasing is a technique which is used to clarify meaning by restating the meaning of a sentence or clause in another way.

A common characteristic of items in the derived lexicon is that they are syntactically paraphrasable collocations, except for Type III items, which have become formulized and have lost the ability to be meaningfully

paraphrased syntactically. Some examples of syntactic paraphrases are:

Type I phrasal unit (context dependent)

cigarette smoking mothers for mothers who smoke cigarettes

There is a grammatical basis for the context dependence of Type I phrasal units: the underlying structures from which they derive contain non-specific elements. An example given above is cigarette smoking mothers which does not specify which cigarette smoking mother but in fact means "expectant cigarette smoking mothers" in there exists a proven tendency for smaller infants to be born of cigarette smoking mothers.

Another example is forecasting ability. Taken out of context, forecasting ability is not explicit. Its underlying meaning is someone has the ability to forecast something. However in context, the phrasal unit can be understood, as in By culturing fetal cells obtained from a sample of amniotic fluid and then counting their chromosomes, they could make their diagnosis early enough in pregnancy to give the parents the choice of having an abortion. Thousands of parents have taken advantage of this forecasting ability. In this example, the sentence which precedes the phrasal unit forecasting ability makes it clear that the object of forecasting is whether or not the chromosome count is normal so that the meaning is ability to forecast whether or not the chromosome count is normal. The phrasal unit refers to the medical (laboratory) procedure known as amniocentesis, the results of which will show among other results whether the fetus is free of genetic disorders which can be detected.

A further example of context dependence in the Type I category is drug ingestion. Here the underlying object drugs has a non-specific

premodifier: someone ingests some kind of drugs. The drugs could be licit or illicit. Drugs may be prescribed, sold over the counter, or bought illicitly. The taking of prescribed drugs in excess would be considered to be an abuse of drugs. Because of the various meanings possible for drug ingestion, context is needed to clarify the meaning in a particular passage. However, if a premodifier such as antepartum (before childbirth) or prenatal is used, as in antepartum or prenatal drug ingestion, which means "drugs ingested before childbirth," the phrasal unit antepartum drug ingestion becomes a context independent phrasal unit, hence Type II.

Still another example of context dependence in the Type I category is poor fetal stores, which is a common collocation but not a conceptual entity because what is specifically stored is not syntactically retrievable. There are stores of "something" in the fetus. This phrasal unit can only be paraphrased in context. For example, anemia in the mother may lead to poor fetal stores of iron.... One paraphrase of poor fetal stores would be poor stores of iron in the fetus.

Other examples are caloric restriction and inadequate diet. These phrasal units provide incomplete information. The reader does not know the frame of reference in which the phrasal unit is being used. Questions may be raised as to what is meant by restriction. Restriction for whom? What degree of caloric restriction? For what condition? Is caloric restriction a positive or adverse factor? Under what conditions? It is thus the presence of a word with non-specific referent in the underlying structure that makes Type I phrasal units context dependent. In other words, Type I phrasal units lack specificty of meaning.

Type II phrasal unit (context independent)

Conversely, Type II phrasal units are context independent because all of the constituents have specific referents. They are explicit and therefore can be understood outside of context. For that reason, they are a part of the professional jargon that facilitates communication. An example of a Type II paraphrasable collocation is immediate pregravid weight, which is a context independent phrasal unit deriving from the weight of the expectant mother immediately prior to pregnancy.

The Type II context independent lexical items explored in this study were phrasal units which label conceptual meanings in public health. Because they derive from underlying structures with specific referents, they embody public health concepts that are understood by the audience for whom they are intended: public health professionals and students in this field.

Some Type II derived phrasal units are further reducible to either nouns e.g. team from health team, or nominalized adjectives, e.g. professional(s) from professional workers (see Fig. 1). Professional nominalized becomes professional(s) a count noun. However, nouns which are left as remnants of a reduced phrase are context dependent, e.g. team. The word team is context dependent because it can refer to various kinds of teams--diagnostic, surgical, health, and non-medical teams. The specific referent is not retrievable. Noun remnants of reduced phrasal units must be seen in context to be understood.

In contrast, nominalized adjectives left as remnants, like professional(s) are context independent because the noun is retrievable--it is "understood." Another example of a nominalized adjective is physical(s),

which is a remnant of physical examination. A paraphrase can be examinations done by a physician.

Some Type II phrasal units are reducible to acronyms. Acronyms are based on syntactically paraphrasable collocations. For example, the acronym CHSD stands for Children's Health Services Division. The acronym is formed from the first letter of each of the four written words in this phrasal unit. The phrasal unit in turn has been derived from a division in a Department which provides services to children.

An acronym is similar to formulaic items (Type III phrasal units) in that once an acronym is formed, it is used as a label or name. For example WHO is often used instead of World Health Organization. WHO is usually spelled out rather than pronounced as a single word /huw/. It appears that acronyms of Type II like that of the pseudo-derivation class Type III are as a rule not paraphrased because they are essentially names and labels. The unresolved problem here is whether or not Type II derived acronyms should be classified under Type III phrasal units in the final analysis.

Items in the derived lexicon may or may not have been morphologically processed. As in any derivation, there will be morphological changes as appropriate and these must be taken into account. A nurse who is trained, restated as a reduced phrase becomes a trained nurse. No morphological change is required for the lexical item trained, since the same form can be either verb or adjective. However, when services which provide tests is reduced, it becomes testing services. A morphological change has been necessary, from tests to testing. In some instances root morphological changes are needed, as in health services for mother and child, which,

when reduced becomes maternal and child health services. Mother is changed from a noun form to an adjective form maternal. When the phrasal unit is further reduced by deleting and and all letters of each word except the initial letters, an acronym is formed: MCHS (Maternal and Child Health Services).

Phrasal units, Type II and III in particular, which are context independent and therefore represent conceptual meanings, occur frequently. They tend to follow common syntactical patterns. Some examples of these phrasal units and their patterns are given below:

Premodification of head noun (N) by one or more nouns (N or NN):

Examples of noun premodifiers:

NN: pregnancy wastage, birth length, head circumference.

NNN: blood group antibodies, health maintenance organizations, World Health Organization

Premodification of head noun by -ed (ED) and -ing (ING) participles:

(A = adjective)

Examples: ING participles as premodifiers

N ING N: child bearing age
N ING A N: mortality producing obstetric antecedent
N ING N: home nursing care

Examples of ED participles as premodifiers:

ED A N: generalized maternal malnutrition
N ED N: ethanol-induced dysmorphogenesis

Premodification by adverbs (ADV) + other premodifiers:

Examples:

ADV ED N: genetically conditioned handicap
environmentally produced diseases

ADV A A N: cytogenetically detectable chromosomal anomalies

ADV N: out-of-wedlock pregnancies

ADV A V-N: too rapid child-bearing (V-N = verbal noun)

Pseudo-derivations

Pseudo-derivations are Type III phrasal units. Unlike derived lexicon, they are collocations that are syntactically non-paraphrasable. Structurally these phrasal units have the same form and characteristics as those derived Type II phrasal units which are context independent, but they have lost their lexical relationship with their underlying source and are therefore not syntactically paraphrasable. They are used as titles, names, or labels, and are invariant not only in meaning but as fixed collocations and may therefore be considered to be formulaic designations. Examples of these collocations are: medical director (a professional title), digestive system (name of one of the systems of the body), and blood pressure reading (name of a medical procedure).

As mentioned above, phrasal units in this class do not lend themselves to paraphrasing. While it may be speculated that at some earlier point in the lexical derivation process, these phrasal units were derived from underlying phrases or clauses, they have assumed a role as fixed titles or labels. Paraphrasing would result in language that is unnatural and unused by native speakers and would therefore not result in samples of real English language use. For example, a native speaker using EPM, who is referring to the spinal cord would not refer to it as the *cord of the spine. Nor would he refer to the digestive system as the *system

for digestion.

Many Type III phrasal units are reducible to acronyms. For example: central nervous system: CNS, white blood count: WBC, Upper Respiratory Infection: URI. One of the crucial factors in determining whether a phrasal unit is reducible to an acronym seems to be its context independent status. Context independence implies that the essential constituents are present in the surface structure, or retrievable from the underlying structure (as in nominalized adjectives). Context independence also implies that the phrasal units so identified express conceptual meanings. Both Type II and III phrasal units are context independent and therefore can generate acronyms. In contrast, Type I phrasal units lack specificity and are therefore context dependent. By implication they are irreducible to acronyms.

Simple Lexicon

Items in the simple lexicon are lexically paraphrasable. Since they are not phrasal units like the derived lexicon and pseudo-derivations, they are not syntactically paraphrasable. They are therefore non-collocations. Words selected for the present study were either single lexical items borrowed from ordinary English which are assigned special meanings or prefixes + bases which are borrowed or are loan words from Greek/Latin.

Of the simple lexicon in EPM, words borrowed from ordinary English are context dependent. The primary reason appears to be that these lexical items often connect to referential clusters. For example carrier has as its referents "genetic disease carriers" and "carriers of acquired

(infectious) diseases." In case of the latter, the carrier of the disease-causing organisms may be a healthy, temporarily immune, or chronic carrier, who can transmit the disease to a susceptible person. For example carrier in the following sentence means "carrier of an acquired disease (infectious)": A pregnant woman who has not been immunized against rubella, who is exposed to the disease, especially during the first three months of pregnancy, may become a carrier of the disease and transmit it to her unborn child, or she may transmit the disease to others in the population. In the next sentence carrier means "a carrier of a hereditary disease (e.g. cystic fibrosis)": A carrier of a recessive gene can have affected children only if his or her spouse is also a carrier. Words borrowed from ordinary English, at least in the data of this study, were generally context dependent. A particular word may have a range of meanings from similar to dissimilar to its meaning in ordinary English. Patient is such a word. In ordinary English, patient (noun form) usually means a person who is ill and under the care of a doctor. In EPM, a patient is not necessarily a person who is ill. It is a person who is under the care of a physician. For example, many pregnant women are not ill but are called patients to indicate that they are under the care of a physician. The lexical item patient covers a wide range, at one end of which are pregnant women who are very healthy and at the other end of which are women with severe medical complications. Other words borrowed from ordinary English may have meanings very dissimilar to those of ordinary English. An example is essential. In ordinary English, essential means "necessary" or "indispensable," whereas in EPM essential takes on a special meaning in a phrase like essential

hypertension, where it means a type of high blood pressure whose origin is unknown. Words that are borrowed from ordinary English for EPM are thus context dependent primarily because they are assigned special meanings but also because they are identical in appearance with ordinary English words.

The process through which words are borrowed from ordinary English is discussed by both Kinneavy (1971) and Savory (1967). In general, they say that in writing about a new discovery or technique, a scientist or technologist attempts to select lexical items that will give an explicit description. One way to ensure that the proper meaning will be transmitted to his audience is for the medical writer to assign special meanings to words he selects. These lexical items may resemble ordinary English use or may depart radically from standard English use. At this stage these lexical items are the writer's own idiolect. If the publisher and writer's peers accept the meanings he or she gives to the word(s), and these words gain currency generally, these borrowed words become a part of the "dialect" in that specialized field.

Following are some comparisons between medical and non-medical use of lexical items:

Medical Use	Non-medical Use (The American Heritage Dictionary)
management of labor (used in the context of EPM) Labor refers to the physical efforts of childbirth. Management refers to medical supervision. Therefore management of labor means "medical supervision during the process of childbirth." (Medical use of lexical items is very explicit; whereas ordinary dictionary definitions are general and usually have multiple meanings).	Labor means "physical or mental exertion of a practical nature." Management means "the act, manner or practice of controlling something." (Management of labor in ordinary English, usually means "a commercial enterprise, government agency or industry's practices for handling its employees or work force").

Medical Use (continued)	Non-medical Use
Screening test means "examination of the population (mass or segment of the population) to detect the existence of a particular disease(s)," for example: diabetes, tuberculosis, glaucoma, etc. (a pre-diagnostic test).	Screening is a word of multiple meanings. 1. "refuse such as waste coal separated out by a screen; sifting;" 2. "the mesh material used to make door or window screens" 3. "the presentation of a motion picture"
Fetal environment means "internal physical conditions; intra-uterine"	Environment means "external or extrinsic physical conditions that affect and influence the growth and development of organisms."
Carrier (a genetic disease terminology or a terminology relating to acquired diseases). "One who is not directly affected by the defective gene but who carries it and may transmit it to offsprings; or (acquired diseases) one who does not have active disease but is a carrier and can transmit it to others e.g. Salmonella bacteria."	Carrier means "one who transports or conveys. One that deals in transporting passengers or goods."
Primary prevention of birth defects usually refers to the prevention of birth because medical science is not yet able to prevent most of the birth defects of genetic origin except through the prevention of birth, except in a few acquired diseases (e.g. immunization against German measles taken by a non-pregnant female will protect her future offsprings from having rubella syndrome).	(There is no terminology for primary prevention in ordinary English)

The general characteristics of simple lexicon items which are borrowed from ordinary English are similar in many respects to those of

Type II phrasal units. Simple lexicon items are invariant in meaning but they may have a range of referents. For example, the specialized meaning for patient in medical lexicon is a person who is under the management and care of a physician. Management and care may be extended a wide range of prenatal patients--that is, a healthy patient, a patient with an acute illness, patients with mild to severe complications. Simple lexicon contrasts with Type II phrasal units in that simple lexicon items are not syntactically paraphrasable collocations. Words borrowed from ordinary English appear to be context dependent presumably because they are indistinguishable from ordinary English words.

The next class of simple lexicon, and the last of the types of lexical items explored in this study, is words which are borrowed from Greek or Latin of which only prefixes + bases were studied.

Meaning can be derived through morphological processing such as occurs when prefixes are affixed to bases or roots, in contrast with syntactical processing. However the actual process through which prefixes are affixed is not included in this study. Words with prefixes are treated as simple lexicon here. Like other "shorthand" forms of vocabulary, words with prefixes are characterized by brevity of form. Prefixes are frequently used in scientific writing, and in medical English they are characterized by condensed or substantive meanings, e.g. ab-normal when referring to an infant frequently means that the infant is both mentally and physically affected. The anti in antibiotics does not simply mean against as is frequently the case in ordinary English (e.g. anti-social). It means "inhibiting." Antibiotics means "a chemical

substance which is used to inhibit the growth of or to destroy bacteria and other microorganisms, used largely in the treatment of infections." Prefixes in medical English tend to be invariant in meaning.

Following are some of the combinations of prefixes + bases (roots) which co-occur frequently in medical English:

Prefix[1]		Meaning and Examples of Prefixes + bases (roots)
ab-	(Latin)	from, away from, off e.g. abnormal, abnormalities
ante-	(Greek)	before e.g. antenatal
anti-	(Greek)	against or over against e.g. antitoxin, anticoagulant, antibiotics
contra-	(Latin)	against, opposed e.g. contraindicated
de-	(Latin)	down or from, sometimes it changes the meaning of a term from positive to negative e.g. deformed
dis-	(Latin)	reversal or separation e.g. dislocation
dys-	(Latin)	a combining form signifying difficult, painful, bad, disordered e.g. dysfunction
in-	(Latin)	in, within, into; also a negative or intensive meaning e.g. inadequate, inborn, infertile (also: il- before l, im- before b, m, p, ir- before r, in- before all others)
intra-	(Latin)	in, within, inside of e.g. intrauterine
mal-	(Latin)	bad(ly) e.g. malformation, malnutrition
neo-	(Greek)	combining form--new e.g. neonate, neonatal, neonatologist
over-	(Latin)	too much e.g. overnutrition, overweight
peri-	(Greek)	around e.g. perinatal
pre-	(Latin)	before e.g. prenatal, preeclampsia, predisposition, prepregnancy
re-	(Latin)	back, again, contrary e.g. reproduce, reproduction
sub-	(Latin)	under, near, almost or moderately e.g. subfertility
under-	(Latin)	too little e.g. undernutrition, underweight

Using Quirk and Greenbaum's classification of prefixes (1973), the prefixes selected for attention in this study were:

1. Largely negative or reversative meanings (but non-emotive) such as ab- abnormal, contra- contraindicated, de- deformed, dys- dysfunction

---

[1] References used were: (1) Dorland's Illustrated Medical Dictionary, 1965 (2) Webster's Seventh New Collegiate Dictionary, 1965

2. Prefixes of degree or size: over- overnutrition, under- undernutrition, sub- subfertility

3. Prefixes of time and order: pre- prenatal, peri- perinatal, neo- neonatal

In contrast with ordinary English, prefixes used in EPM exclude emotive and pejorative connotations as, for example, prefixes of attitude such as antisocial, pro-communist. Some pejorative prefixes cited by Quirk (1973) are misleading, maltreat, and misconduct. Such terminologies are not generally used in scientific writing because of their connotative, subjective implications.

Words with prefixes are similar in most respects to words borrowed from ordinary English in that they tend to be invariant in meaning, are assigned substantive meanings, and are lexically paraphrasable. They contrast with words borrowed from English in that they are context independent. They do not have membership in referential clusters. They are therefore distinguishable from ordinary English words which have multiple meanings.

The focus in this chapter on the analysis of derived lexical items has been upon the lexical/grammatical processes through which meaning is derived. With regard to simple lexicon, the focus has been on the prerogatives of the medical writer to assign meanings of his choice, which then are subject to peer acceptance. Thus the discussion has pointed up the flexibility of language to respond to the language needs of the native speaker/writer.

Generalizations about English for preventive medicine

Some generalizations can be drawn from this study regarding phrasal units and simple lexicon which are used in EPM (see Figure 2).

Figure 2 about here ( )

1. Types I, II are paraphrasable but Type III pseudo-derivations

Figure 2.

DISTINCTIVE FEATURES OF THE LEXICON

A. DERIVED LEXICON: Phrasal Units

RELATIONSHIP TO SYNTAX				RELATIONSHIP TO LEXICAL MEANINGS	
TYPE	SYNTACTICALLY PARAPHRASABLE?	REDUCIBLE TO REMNANTS?	REDUCIBLE TO ACRONYMS?	CONTEXT INDEPENDENT? (PUBLIC HEALTH CONCEPTS)	USED AS TITLE/ LABEL?
	+ -	+ -	+ -	+ -	+ -
I	+	-	-	-	-
II	+	+	+	+	-[2]
III	-	-	+	+	+

[2] See Generalizations, No. 4

B. SIMPLE LEXICON

BORROWED WORDS	CONTEXT INDEPENDENT
	+ -
Ordinary English	-
Greek/Latin Prefixes + Bases	+

are not. The latter are titles/labels. Examples are:

Type I overweight patient or a patient who is overweight.

Type II newborn infant or an infant who was born very recently.

Type III spinal cord but not *cord of the spine.

2. Only Type II (derived phrasal units) are reducible to remnants because these remnants have deleted, specific constituents which are derivable from the underlying structure. The remnants derive from phrasal units that contain the specific constituents. Therefore they express conceptual meanings in public health. If the surface structure (remnant) is a nominalized adjective (e.g. newborn(s)), it is context independent. If the remnant is the original head noun, it is context dependent (e.g. infant).
3. Not all Type II phrasal units are reducible. It may be that if the pattern of the phrasal unit is NN it is not reducible. For example, birth weight, health maintenance, pregnancy wastage.
4. Type II and III phrasal units are reducible to acronyms because these phrasal units are context independent and refer to explicit public health concepts. A question arises as to whether acronyms which theoretically originate as derived phrasal units, are members of the derived Type II class or whether they have shifted to Type III phrasal units. They are in fact "shorthand" labels in their final forms. Type II and III phrasal units seem to have the propensity of alternating between two structural forms, the phrasal unit or acronyms. Examples are: World Health Organization or WHO (Type II), and central nervous system or CNS (Type III).
5. Only Type II and III phrasal units are context independent. They

contain the essential constituents to express public health concepts. Type I phrasal units are incomplete insofar as the essential constituents are concerned to express a public health concept. For example, drug ingestion (Type I) lacks specificity; whereas an explicit premodifier such as antepartum (antepartum drug ingestion) gives specific topical information, that is, it means "drug that is ingested before childbirth." The complete phrasal unit antepartum drug ingestion is context independent. Type II and III are basically similar in syntactic/lexical form and in their ability to express public health concepts. However the fundamental difference appears to be the limitation in meaning which attaches to labels/titles. They have become formulaic. Many Type II phrasal units, on the other hand express broad public health concepts. They are syntactically paraphrasable.

6. Type III phrasal units and acronyms are formulaic titles/labels. Acronyms based on Type II phrasal units are also titles/labels. So Type II acronyms seem to shift to the pseudo-derived class.
7. Simple lexicon items are either context dependent or independent. Words borrowed from ordinary English are context dependent because they are identical in appearance as ordinary English words which usually connect with referential clusters. They must therefore be seen in context to be understood. On the other hand, prefixes + bases (borrowed from Greek/Latin) do not belong to referential clusters. They can be understood outside of the discourse in which they occur and are therefore context independent.
8. Lexical items used in EPM are generally invariant in meaning.
9. The use of compressed terminology seems to be one of the most frequent characteristics of EPM.

V. MATERIALS DEVELOPMENT

This chapter is directed to the attention of materials writers and instructors who are interested in instructional materials in the medical English lexicon, specifically that of preventive medicine.

In Chapter III, the term scientific style, a style to which EPM belongs, was used to label the specialized uses of vocabulary and grammar which differentiate this style from that of ordinary English. Many foreign graduate students in public health do not ordinarily have an opportunity to study the special characteristics of EPM before their arrival in the United States. This chapter discusses problems that these language learners may encounter which emanates from scientific style. Illustrations of exercises which may help foreign language learners with specific lexical problems will also be presented. Some of these vocabulary exercises were used or developed in a pilot materials development project which was a part of this study. The exercises used in this pilot study were tried out on nine volunteer subjects, all foreign graduate students who were entering the School of Public Health at the University of Hawaii, and two other graduate students enrolled in other specialized fields. For all the exercises, public health textbooks were the source of authentic texts used as the vehicle for instruction.

Before exercises are given to students, an assessment should be made of their current knowledge of EPM. An assessment will point up the individual problems and needs of these students. One form of assessment is a preliminary exercise using two or three passages from public health

textbooks. These passages should contain examples of lexical items from the three classes of English for preventive medicine (and sub-classes of each) which were identified in this study (see Fig. 1). The teacher gives the textual passages to the students and asks them to underline all words and phrases that they consider to be EPM lexicon.

Following is an example of a passage that could be used for the preliminary assessment with the targeted items underlined:

> It is increasingly apparent that effective prenatal care must be given by a health team. While family physicians in rural areas continue to give maternity care often because no specialists are available, family physicians in many areas no longer do obstetrics. Increasingly in rural areas there are no physicians, and the stereotyped overcrowded city hospital is a reminder that there are no physicians in urban ghettos either.
>
> The HSMHA Maternity and Infant Care Projects have demonstrated the value of the health team. The pregnant patient may need assistance from a social worker, from a public health or other nurse, from a nutritionist and often requires substantial dental care. The pediatrician should be a part of the team, particularly in care of the identified high risk prenatal patient. Genetic diagnosis and counseling are necessary adjuncts. The health team should be headed by a physician but in many instances care which is now considered the responsibility of the physician might be delegated to other members of the team. Prenatal care could be carried out by a nurse-midwife or a trained nurse, and in some instances normal delivery might also be the responsibility of the nurse-midwife. Individuals under the broad rubric of physician-assistant could be responsible for technical details, particularly in the management of labor. While all of these team individuals will be involved in patient education, more structured programs may be necessary for particular groups, especially the pregnant adolescent. (Passages from Wallace et al 1973:237)

The teacher will have two identical lists of the same targeted lexical items which are extracted from the passage. This is the Classified Check-off List. The teacher's list will provide the names of the classes and sub-classes to which these lexical items belong. The students' list, of which there will be a copy for each student, will

show only the list of lexical items and not the names of the classes nor the sub-classes.

When the students complete the first phase of the exercise, that is, underlining the words/phrases which they consider to be English for preventive medicine, a copy of the students' Classified Check-off List will be given to them. The students will then be asked to underline on the list those items that they identified. These lists are then returned to the teacher. The teacher can then see which classes of lexicon seem to be the least familiar to the students as a whole and to the individual students.

Following is the teacher's Classified Check-off List for the passage above:

Classified Check-off List of English for preventive medicine

(Teacher's copy)

Derived Lexicon	Pseudo-derived Lexicon	Simple Lexicon
Type I Phrasal Units	Type III Phrasal Units	Words borrowed from:
patient education	family physicians social worker	Ordinary English
Type II Phrasal Units	public health nurse nurse-midwife	management of labor
effective prenatal care health team	physician-assistant	Greek/Latin:
maternity care city hospital		prefixes + bases:
dental care trained nurse normal delivery		prenatal

Derived Lexicon (continued)

Noun remnants:

specialists (medical)
care (medical care)

Acronyms:

HSMHA (acronym for:
Health Services Mental
Health Administration)

Simple Lexicon

Other*

nutritionist
pediatrician
physician
abortion

*Other refers to words borrowed from Greek/Latin other than prefixes + bases, e.g. pediatrician, physician

Following the assessment of the language learners' ability to recognize the different kinds of EPM lexicon, vocabulary exercises may be constructed to meet the needs of these students. In general, students who have sufficient lexical competence in specific areas should not be required to spend unnecessary time on exercises dealing with what they already know. Their time would be more productively used in areas in which they are having difficulty. Individualizing instruction may pose problems in a large class, but in a group of 10-12, it is probably possible to group students for special exercises. Grouping may be on a self-selected basis as well as by teacher selection.

Exercises may be constructed on the basis of needs and problems that surface during the assessment and on other problems that the teacher/materials writer may anticipate. It is not the intention of this chapter to suggest exercises for all sub-types of classes of EPM lexicon, and for all problems that may be anticipated, but rather to suggest a sufficient variety of examples in an attempt to stimulate further exploration and testing by others.

Six exercises will be presented below as examples.

The first three focus on the derived lexicon. They are: (1) an exercise on phrasal units focusing on form to teach/learn how to recognize two kinds of reduced phrases, context dependent reduced phrases and context independent reduced phrases: (2) an exercise on phrasal units focusing on meaning, to teach/learn the relationship of surface structures to underlying meaning through paraphrasing; and (3) an exercise on acronyms, to teach/learn how they are formed, in order to illustrate a type of very compressed terminology. The fourth focuses on the pseudo-derived lexicon: (4) an exercise using formulaic lexical items, to help students to recognize these forms and to understand the various kinds of meaning they represent such as professional titles, diagnoses, labels for medical procedures, names of agencies and organizational units within agencies. The last two focus on the simple lexicon: (5) an exercise on words borrowed from ordinary English which are assigned special meanings, primarily to help students to recognize the specialized use of vocabulary in EPM, and (6) an exercise on words (prefixes + bases) borrowed from Greek/Latin, to illustrate their major characteristics--invariant and substantive meanings, and the use of non-emotive meanings.

Following each exercise is a discussion of the teaching points incorporated in the exercise.

Exercises on the derived lexicon

Following Exercise 1 are the passages which have been marked according to the instructions in the exercise.

Exercise 1. The form and meaning aspects of reduced phrases.

READ THE EXPLANATORY MATERIAL, STUDY THE EXAMPLES, AND FOLLOW THE INSTRUCTIONS GIVEN IN CAPITAL LETTERS.

Step 1. Reduced phrases are referred to as phrasal units in this exercise. They are composed of one or more modifiers + the head.

Examples:
growth processes
severe caloric restriction

In the passages below, the head of each phrasal unit is underlined as illustrated above.

YOU ARE TO UNDERLINE THE MODIFIER(S)

Example:
severe caloric restriction

Step 2. IN THE MARGIN, COPY THE PHRASAL UNITS AND UNDERLINE THEM.

Step 3. Each modifier can be named by its part of speech.

Example:

severe	caloric	restriction
A	A	N

IF YOU ARE FAMILIAR WITH THE PARTS OF SPEECH, IN THE MARGIN, USE THE ABBREVIATIONS GIVEN IN THE FOOTNOTE[1] AS ILLUSTRATED ABOVE.[2]

Step 4. Each modifier is related to the head in one of four ways:

(a) A modifier may describe the head.

Example: (underweight) (woman)

---

[1] Abbreviations of parts of speech: N = Noun, A = Adjective, Adv = Adverb, ED or ING = participles

[2] Identification of the parts of speech need not be required of the student, but the grammatical implications should be understood at least by the teacher.

(b) Frequently a modifier plus its head is a compound expression conveying a public health concept.

Example: (expectant mother)

(c) Modifiers may each modify the head which may be a single word or a compound expression.

Examples:

(non-alcoholic)(control)(women)

(normal)(healthy)(expectant mothers)

(d) A modifier may describe another modifier, and together they modify the head.

Example:

(weight reduction)(regime)

MARK THE EXPRESSION YOU HAVE UNDERLINED WITH PARENTHESES AND CURVED LINES AS IN THE ABOVE EXAMPLES (4a-d)

(1) IF THERE IS ONLY ONE MODIFIER AND A SINGLE HEAD, JOIN THE MODIFIER TO THE HEAD. (SEE EXAMPLE 4(a) ABOVE)

(2) IF THERE IS MORE THAN ONE MODIFIER, JOIN EACH TO THE APPROPRIATE WORD(S). (SEE 4a-d) ENCLOSE COMPOUND EXPRESSIONS WITH PARENTHESES

Example: (expectant mother)

JOIN MODIFIERS WITH A CURVED LINE TO SHOW THE RELATIONSHIP.

Example: (normal)(healthy)(expectant mother)

Step 5. Type I phrasal units are context dependent. They are phrases that either are general in meaning (such as standard weight) or express an incomplete idea and do not tell you exactly what they are referring to.

Examples:

poor fetal stores. You must read the

passage and understand the context (situation and meaning) in which it is found in order to understand the meaning. In the above example, poor fetal stores refers to poor fetal stores of iron.

growth processes. The phrase is used in connection with the growth processes of the fetus.

The above are examples of context dependent phrasal units which cannot be understood outside the context of the passage.

Type II phrasal units are context independent. They are those that can be removed from the passage and still be understood.

Examples:

developing fetus

immediate pregravid weight

Type II phrasal units have meanings that are constant and unchanging.

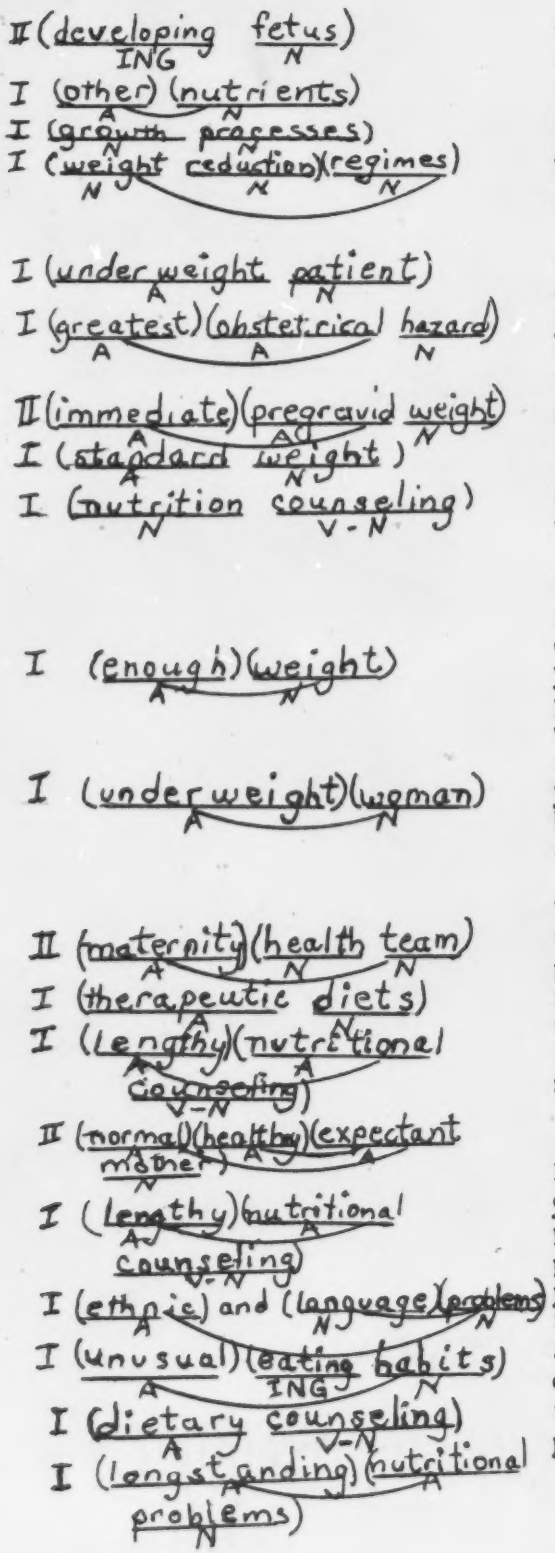
IN FRONT OF EACH PHRASAL UNIT THAT YOU HAVE MARKED, CLASSIFY EACH PHRASE, USING NUMBER I FOR TYPE I CONTEXT DEPENDENT PHRASAL UNITS AND II FOR TYPE II CONTEXT INDEPENDENT PHRASAL UNITS.

Passages for Exercise 1[3]

I (Severe) (caloric restriction)
A A N

Severe caloric restriction, which has been very commonly recommended is potentially harmful to the

[3] Passages from Wallace et al (1973:324).



developing fetus and to the mother and almost inevitably restricts other nutrients, essential for growth processes. Weight reduction regimes, if needed should be instituted after pregnancy has terminated.

Since the underweight patient constitutes the greatest obstetrical hazard, priority should be given to these patients. An appropriate criterion is the immediate pregravid weight related to the standard weight for age and height. It is suggested that patients be selected for nutrition counseling who are 10% or more underweight.

Experience has shown that small slender women often have a great deal of difficulty gaining enough weight during pregnancy. These patients are often overtired as well as undernourished. Provision should be made for the underweight woman to be able to rest and to have the services of a dietitian available to her.

To improve the effectiveness of the maternity health team, it will prove necessary to separate patients into groups: those who require therapeutic diets, those who need lengthy nutritional counseling, and normal, healthy expectant mothers.

Patients needing lengthy nutritional counseling would include adolescents, patients with inadequate food budgets, patients with ethnic and language problems, and those with unusual eating habits. Finally women planning a future family should receive dietary counseling...the ideal time to treat longstanding nutritional problems is before conception.

Discussion. Exercise 1, on the derived lexicon, is designed to help the language learner to focus primarily on form. However, since structural forms and lexical meanings are interrelated, it is difficult to discuss one in complete isolation from the other. Therefore this discussion will begin with an analysis of some aspects of form but will also include implications for meaning, specifically in relation to teaching/learning how to recognize the two kinds of reduced phrases. These phrases are examples of compressed terminology: context dependent phrasal units (Type I) and context independent phrasal units (Type II).

Some aspects of form

Type I and II phrasal units appear to be similar in form in most respects. For example, both are reduced phrases; both appear to have a variety of similar lexical/grammatical patterns, such as (1) a single premodifier + head (enough weight-- Type I; medical record--Type II), (2) a single premodifier + a compound head (lengthy nutritional counseling--Type I; maternity health team--Type II), (3) multiple premodifiers + head (severe caloric restriction--Type I; identified high risk prenatal patient--Type II), (4) premodification by a premodifier (weight reduction regime--Type I; problem-oriented medical record--Type II). Each of these phrasal units has some variation in grammatical pattern in terms of parts of speech, but they are basically similar patterns (see Exercise 1). Thus, structurally, Type I and II phrasal units appear to be more similar than dissimilar. There seems to be one exception; that is, Type II phrasal units seem to have, uniformly, a compound

head (premodifier + head), whereas Type I phrasal units do not necessarily have compound heads, although they do have them frequently (e.g. Type I--early death, inherited deficiency, prenatal detection). This difference between Type I and II phrasal units is accounted for primarily in terms of meaning rather than of form, which will be discussed next.

Some aspects of meaning

The basic difference between Type I and II phrasal units lies in the fact that Type I units are context dependent phrasal units which cannot be understood outside of the textual passage in which they are placed whereas Type II units are context independent phrasal units which can be understood outside of context. Context dependent phrasal units are either general, lacking in specificity (e.g. standard weight) or they provide only partial information and therefore do not express conceptual meaning per se. In either situation the specific referent is not built into the phrasal unit.

On the other hand, Type II context independent phrasal units are specific and can be understood out of context by the audience of public health professionals and interested individuals for whom they are intended. These phrasal units form labels for public health concepts and therefore they can be isolated from their textual passage and still be understood. Specificity appears to be the direct consequence of the derivational process which places a specific modifier (one used in EPM lexicon) in front of a general head, which in combination (specific premodifier + general head) results in conceptual meaning (e.g. prenatal used as a specific

premodifier of care, a general lexical item whose referent is medical/health care = prenatal care)

Thus the analysis above indicates the significant relationship between surface structures and their underlying meanings.

The main instructional point in Exercise 1, is to focus the attention of language learners on how to recognize two kinds of forms, context dependent and context independent phrasal units and their implications for meaning (public health concepts).

Exercise 2. Reduced Clauses

1. This exercise consists of two parts. The sentence on the left side contains a reduced phrase (phrasal unit) which is underlined. Phrasal units are forms that are derived from expanded forms which have the same meaning or nearly so. For example: pregnancy testing services is derived from a clause such as services which provide tests that will show whether women are pregnant or services to test for pregnancy.

IN (a) and (b) ON THE RIGHT, FILL IN THE BLANKS TO COMPLETE THE PARAPHRASES FOR EACH OF THE PHRASAL UNITS. This exercise involves both vocabulary paraphrasing and grammatical paraphrasing.

2. FOR (c), WRITE A THIRD SENTENCE WHICH CONTAINS ANOTHER PARAPHRASE OF THE SAME PHRASAL UNIT. PARAPHRASE ONLY THE REDUCED PHRASE. UNDERLINE YOUR PARAPHRASE.

Sentence with phrasal units	Paraphrases
Anemia in the mother may lead to poor fetal stores of iron predisposing to anemia in infancy.[4]	(a) Anemia in the mother may lead to poor (stores) of iron in the (fetus).

[4] Passage taken from Wallace et al (1973:237, 238).

Paraphrases (continued)

(b) Anemia in the mother may lead to (stores) of iron in the (fetus) that are (inadequate).*

*Use a synonym of poor.

(c) Anemia in the mother may lead to inadequate storage of iron in the fetus, predisposing to anemia in infancy.

Discussion. For teaching and learning purposes, a useful technique for clarifying the relationship between surface forms and their underlying meanings, is through the use of paraphrases. Paraphrasing, which is the major technique used here, is a way of restating meaning in another form. Such restatement should be done with as much accuracy as possible to express the original meaning. It should be pointed out that for instructional purposes paraphrasing should itself exemplify natural language use, whether it is expressed in EPM or in ordinary English.

In addition to clarifying meaning, paraphrasing provides the language learner an opportunity to develop insight into the derivation of reduced clauses and phrases by expanding them. Also, the reverse process of analyzing how clauses are reduced may be discussed with the language learners.

For example, taking this sentence from authentic textual materials--Pregnancy testing services should be widely available--in which the reduced phrase pregnancy testing services occurs, the first step in the process of paraphrasing is to expand the reduced phrase pregnancy testing services. The head of the phrase is services. Testing describes

the kind of services under discussion. Pregnancy testing refers to a process of finding out whether women are pregnant. Therefore one paraphrase can be: Services which provide tests that will indicate whether or not women are pregnant should be widely available.

The reverse process is as follows: keeping the meaning in mind and adjusting the form as appropriate, the next step is to reduce the clauses in the sentence, Services which provide tests that will indicate whether or not women are pregnant should be widely available. The first clause to reduce is: which provide tests. The referent for which is services. "The services provide tests." "The services do testing." "The services are testing services." In addition to forming a phrasal unit, testing services now assumes a role as a member of a class of services, that is, one that provides testing, which in this case refers to pregnancy.

The next step is to reduce the second clause: that will indicate whether or not women are pregnant. Pregnant describes the possible condition of women who may need these services. Substituting testing services for that the clause will read testing services will indicate whether women are pregnant. The adjective form pregnant must be nominalized to pregnancy (because testing services are not pregnant) and moved in front of testing services. The clause that will indicate whether or not women are is then deleted. The complete sentence through clausal reduction is now Pregnancy testing services should be widely available.

The foregoing example illustrates how a teacher can apply the analytic approach. Significant lexical and grammatical forms are extracted from the text and analyzed for instructional purposes. The essential point in this example is: Meaning can be expressed in two ways, by using either

expanded forms or reduced structures.

Exercise 3. Acronyms

IN THE SENTENCES BELOW UNDERLINE THE WORDS THAT YOU THINK HAVE ACRONYM FORMS. THEN FILL IN THE BLANKS TO FORM THE ACRONYMS. USE CAPITAL LETTERS ONLY.

1. UNDERLINE THE NAME OF A SYNDROME.

   Two children with fetal alcohol syndrome have been identified in the newborn period.

   Acronym: F A S

2. UNDERLINE THE NAME OF A MEDICAL PROCEDURE:

   The variables most widely used for fetal monitoring is fetal heart rate.

   Acronym: F H R

3. UNDERLINE THE NAME OF A COUNCIL:

   ...there was a three-year study on maternal nutrition and the course of pregnancy, conducted by the National Research Council's Committee on Maternal Nutrition...

   Acronym: N R C

Discussion. Since acronyms represent an abbreviated word type which exemplifies an extreme form of compressed terminology, it seems to be essential that language learners learn/be taught the meaning of these invented words, especially because they are context independent and hence label public health concepts. Acronyms are also important in terms of the frequency with which they are used and the variety of terminology they represent. Some examples are diagnoses, such as Fetal Alcohol Syndrome, or FAS, names of agencies, such as Children and Youth Project, or C & Y Project; medical procedures such as fetal heart rate, or FHR; mechanical devices such as intrauterine device, or IUD. Some examples of

acronyms should be given to students before they are asked to do the exercises above.

Exercise on pseudo-derived phrasal units

Exercise 4.[5] Formulaic items

Pseudo-derived phrasal units form labels for professional titles such as general practitioner, cardiac specialist; labels for medical institutions such as, general hospital, skilled nursing facility; names of parts of the body, such as, left shoulder, right shoulder; names of laboratory procedures, such as cholesterol count, blood count; and countless other labels and names used in English for preventive medicine.

Formulaic items are fixed titles or labels and therefore they should not be paraphrased.

1. UNDERLINE THE NAME OF A CELL THAT HAS UNDERGONE CELL DIVISION.

   When a cell divides, the nuclear material is seen to form a number of small, deeply staining bodies called chromosomes. The chromosomes replicate and the resulting chromosome pairs segregate in a very precise fashion so that each daughter cell receives a predictable complement of chromosomal material.

2. UNDERLINE THE NAME OF THE CHROMOSOMAL CONSTITUENT OF LIVING CELL NUCLEI.

   Chromosomes are composed of deoxyribonucleic acid (DNA) on a framework of protein.

3. UNDERLINE THE NAME OF A SPECIFIC TYPE OF CHROMOSOME AND ITS SUB-CLASSIFICATIONS.

   Twenty two pairs (chromosomes) are alike in males and females and are called autosomes, but the remaining pair, the sex chromosomes, differ in the two sexes...

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[5] Passages from Thompson & Thompson (1966:4-8).

In the human female the sex chromosomes are identical and are called X chromosomes. In the human male the two sex chromosomes are quite distinct, one being an X chromosome like the female X and the other being much smaller and known as a Y chromosome.

4. UNDERLINE THE NAME OF A CLASSIFICATION FOR HUMAN CHROMOSOMES.

Human chromosomes are classified, on the basis of size and of centromere position, according to a scheme adopted in 1960 at a meeting of human cytogeneticists in Denver, Colorado. The so-called Denver classification...has proved to be very useful in chromosome study.

Discussion. The surface structures of pseudo-derived lexical items, which are Type III phrasal units, resemble Type II phrasal units, and at least in one major area they perform a similar lexical function; that is, they form labels for conceptual meanings in public health. For example, they form labels for professional titles, such as medical director; labels for laboratory procedures, such as for red blood count, white blood count; names for clinics, such as prenatal clinic. However, these formulaic lexical items contrast with derived lexical items in that they are not syntactically derived and they are not paraphrasable. They are fixed titles, names or labels. Attempts to paraphrase formulaic items result in ungrammatical expressions, for example left lung, *lung of the left; or spinal column, *column of the spine. Since there is such frequent and widespread use of pseudo-derived lexicon in EPM lexicon, it has real implications for teaching/learning.

Exercises on Simple Lexicon

Exercise 5. The identification of technical and sub-technical words--

Words borrowed from ordinary English.[6]

1. IN THE PASSAGE BELOW, UNDERLINE ALL WORDS WHICH YOU THINK ARE BORROWED FROM ORDINARY ENGLISH BUT WHICH HAVE SPECIAL MEANINGS IN ENGLISH FOR PREVENTIVE MEDICINE.

   Examples: patient, (heart) attacks

   These words will be called technical words.

2. UNDERLINE ALL WORDS THAT YOU THINK ARE USED IN SCIENTIFIC/TECHNICAL FIELDS IN ADDITION TO BEING USED IN ENGLISH FOR PREVENTIVE MEDICINE.

   Examples: feedback system, production

   These words will be called sub-technical words

3. UNDER THE PASSAGE, LIST ALL THE TECHNICAL WORDS THAT YOU HAVE UNDERLINED IN THE FIRST COLUMN AND IN THE SECOND COLUMN, LIST ALL THE SUB-TECHNICAL WORDS THAT YOU HAVE UNDERLINED.

Scientists could suddenly move on from the traditional Mendelian study of how traits are transmitted to "expression" genetics--the study of how genes act biochemically at the level of molecules or cells. And it turned out that diseases which seem, in a patient, to be localized to a particular organ, are very often caused by a biochemical defect which shows up (is "expressed") even in cells taken from his skin.

One of the most exciting developments in genetics in recent years, for example, was the discovery of the basic defect that produces atherosclerosis and heart disease in people with familial dominant hypercholesterolemia. This defect leads to early death from heart attacks associated with extremely high concentrations of cholesterol in the blood. Drs. Joseph Goldstein and Michael Brown of the University of Texas were able to find its mechanism simply by studying cultures of skin cells (fibroblasts) taken from patients with the disease. First they analyzed the sensitive feedback system through which normal human fibroblasts turn off the production of cholesterol when they receive information that enough has been manufactured in the body--a system which depends on the effects of a specific lipoprotein in human blood. The cells cultured from patients with familial hypercholesterolemia failed to respond to this crucial lipoprotein, however, and went right on producing cholesterol.

COLUMN 1. Technical Words	COLUMN 2. Sub-Technical Words
expression (genetics), defect, early cells, patient, familial dominant, organ, heart attacks, cultures, normal	act, receive information, shows up, failed to respond, produce, manufactured, turn off, feedback system, transmitted, mechanism

[6] Passages from Pines (1976:12)

Discussion. Words borrowed from ordinary English. Lexical items that are borrowed from ordinary English were noted to be problematic for students in the pilot materials project. Many of the students seemed to be unaware of or unable to recognize certain specialized, public health meanings of such items and tended therefore to misunderstand the meaning that was conveyed by the passage. Some of the lexical items that this group of language learners misunderstood or overlooked in the textual material used were such terms as management of labor, team (when the context referred indirectly to health team) specialists (when the context referred to medical specialists) and social worker, because these language learners, who are public health officials in their native country, do not utilize the service of social workers and therefore did not recognize social workers as members of the health team.

Since textual materials differ widely in the specialized uses they make of simple lexicon, it is the teacher's task to explore and to select passages which will give language learners wide exposure to useful materials. The above examples were taken from textual materials dealing with topics related to maternity care settings.

A useful method for studying the simple lexicon in a passage might be to raise some questions about the specific items that are borrowed from ordinary English and the context in which they are used. Some of these questions might be: Does the writer use the word more than once? Does he define the word? What is the context in which the word is used?

Included in words borrowed from ordinary English are classes of lexical items which are sub-technical, two categories of which will be discussed here. Cowan (1974) defines sub-technical vocabulary as "context independent words which occur with high frequency across disciplines."

Examples he lists are function, inference, isolate, relation, basis, etc. Other sub-technical lexical items that come to mind are research terminology such as problem definition, field investigation, data gathering. These lexical items are commonly used across fields of science and technology and are used with uniform and invariant meanings. Then there are lexical items, also sub-technical, which reflect stylistic choices rather than precise and invariant meanings, examples of which are discussed below.

For purposes of differentiating the more technical lexical items from those that are sub-technical, the following definitions will be used here. Technical lexical terms in this study means words borrowed from ordinary English which are assigned special meanings in EPM lexicon and certain words borrowed from Greek/Latin. These words are generally invariant in meaning, for example: patient, familial, organ. Sub-technical lexical terms are those that are either (1) uniformly defined across scientific/technical fields (such as the research terminology mentioned above); or (2) stylistic lexical choices which are more loosely defined and are therefore not all necessarily invariant in meaning; e.g. in the passage used for Exercise 5, the term failed to respond refers to cells. The same term could be used to explain the inability of a drowning victim to respond to first aid--"the drowning victim failed to respond to cardio-pulmonary resuscitation (CPR)." In the same passage (Exercise 5), the term turn off refers to how "normal human fibroblasts (cells) turn off the production of cholesterol ...." Turn off could be used thus--"the oxygen was turned off," which means "someone turned the oxygen off." Thus, the foregoing examples

illustrate the stylistic choices of lexical items which medical writers make with respect to sub-technical lexical items when explicit terminology is not crucial as is generally true with technical lexical items. This category of sub-technical lexical items was used in the construction of the foregoing exercise.

The instructional point regarding technical and sub-technical categories of lexical items used in medical English is primarily to help students to become aware of the differential use of English in technical fields and to be able to distinguish the technical items from the sub-technical terms.

Exercise 6. Words borrowed from Greek and Latin--Prefixes

1. CIRCLE THE PREFIXES IN THE READING TEXT BELOW e.g. (pre)natal
2. FOLLOW THE INSTRUCTION GIVEN BELOW THE READING TEXT.[7]

Many drugs have been implicated in adverse (peri)natal outcome. Maternal ingestions of thiazide diuretics has been related to a syndrome of (neo)natal thrombocytopenia probably involving a deficit in platelet production. Warfarin derivatives administered therapeutically in pregnancy have been associated with (intra)uterine hemorrhage and fetal death, even in the face of good control of maternal (anti)coagulation. In these instances, namely use of thiazide diuretics and warfarin derivatives, ready alternatives are available in (ante)partum care. One should not use thiazides to treat physiological edema or toxemia of pregnancy.

Heparin can be used rather successfully during pregnancy in place of warfarin compounds.

Tetracycline derivatives are (contra)indicated during pregnancy, except in the control of infections resistant to all other available antibiotics.

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[7] Passages from Wallace et al (1973:269-270).

WRITE THE CORRECT PREFIX IN FRONT OF THE BASES:

Prefixes: auti, anti, contra, intra, neo, peri

Bases:

anti biotics
intra uterine
anti coagulation
pre natal
neo natal
contra indicated

Discussion. Words borrowed from Greek and Latin (prefixes + bases). Because prefixes + bases are examples of simple lexicon that have been borrowed from Greek/Latin, they have been included in these exercises also. The instructional points that are significant are: (1) that prefixes + bases which are used in EPM lexicon are invariant in meaning (2) they have substantive meanings, and (3) they are characteristically non-emotive terms.

Following are a list of prefixes and their meanings, which are used frequently in EPM in relation to high risk pregnancies and birth defects:

Prefix	Meaning
ab-	from, away from, off e.g. abnormal, abnormalities
ante-	before e.g. antenatal
anti-	against or over against e.g. antitoxin, anticoagulant, antibiotics
contra-	against, opposed e.g. contraindicated
de-	down or from (sometimes it changes the meaning of a term from positive to negative) e.g. deformed
dis-	reversal or separation e.g. dislocation
dys-	a combining form signifying difficult, painful, bad, disordered e.g. dysfunction
in-	in, within, into; also a negative or intensive meaning e.g. inadequate, inborn, infertile (also il- before l, im- before b, m, p, ir- before r, in- before all others)
intra-	in, within, inside of e.g. instrauterine
mal-	bad(ly) e.g. malformation, malnutrition
neo-	combining form--new e.g. neonate, neonatal, neonatologist
over-	too much e.g. overnutrition, overweight
peri-	around e.g. perinatal

Prefix	Meaning (continued)
pre-	before e.g. prenatal, preeclampsia, predisposition, prepregnancy
re-	back, again, contrary e.g. reproduce, reproduction
sub-	under, near, almost or moderately e.g. subfertility
under-	too little e.g. undernutrition, underweight

The primary references that were used for the above list are: Quirk and Greenbaum's A Concise Grammar of Contemporary English 1973, Dorland's Illustrated Medical Dictionary 1965 and The American Heritage Dictionary 1975.

These prefixes and their meanings may be discussed with the students before administering Exercise 6.

VI. SUMMARY AND CONCLUSIONS

This study began as a lexical exploration of EPM terminology. It had as its goal the development of a framework for preparing instructional materials on EPM lexicon which could help foreign graduate language learners in the field of public health acquire strategies for learning this terminology. Specifically the object of instruction would be the lexical and syntactic characteristics of English for preventive medicine.

There are three major components in this study:

The first is a discussion of Wilkins' analytic approach, which provides a theoretical base for general language teaching/learning. In this approach emphasis is on the study of significant language forms as opposed to hierarchical orderings of structural forms with higher priority to grammatical structures than to vocabulary, as is the case in synthetic approaches. However, since Wilkins' analytic approach is concerned primarily with general language teaching/learning, data on the specialized grammatical and lexical processes and characteristics of EPM lexicon which were needed for this study was not available. Therefore it became the major task of this study to identify and analyze the important and relevant aspects of medical English lexicon.

The second component part of this study was the actual analysis and development of a schema (see Fig. 1) which characterizes English for preventive medicine in the context of discourse. Three classes of EPM lexicon are identified: the derived (syntactic/morphologic) lexicon, the pseudo-derived (formulaic) lexicon and the simple lexicon (words borrowed from ordinary English and Greek/Latin). Processes influencing meaning,

both syntactic and lexical, are described and distinctive features are illustrated in Figure 2.

The third and final component of the study is discussion of the development of instructional materials. The rationale for these exercises was predicated on vocabulary problems that foreign graduate language learners are presumed to have with EPM because of their lack of familiarity with the specialized uses of English. These exercises were tried out on nine volunteer graduate language learners in the field of public health.

Tentative conclusions that may be drawn from this study are:

There are lexical processes which are characteristic of EPM lexicon based on the observations made in this study. Foreign language learners seem to have need for considerable instructional help with EPM lexicon. Furthermore the pilot materials appeared to be useful to the participants, based on their perceptions of usefulness which these subjects reflected in their brief evaluation of the exercises.

There seems to be little doubt that EPM, using the analytic approach, is readily teachable. A variety of exercises not demonstrated here could be developed to extend the level of the exercises from one which helps them to develop receptive skills to a level of productive skills.

The use of unsimplified authentic texts employing the analytic approach provides an opportunity to teach/learn real language use, thereby making it possible for the language learners to maintain their current level of academic study while learning the specialized use of English.

Despite the note of optimism expressed above, it is premature to

evaluate the actual effectiveness of these exercises. There is a need for refining the exercises, with further testing and broader sampling to confirm or disconfirm the tentative findings of this study.

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